GEOGRAPHIC SCHOOL BULLETINS

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W. ROBERT MOORE, NGS STAFF

KACHIN girls meet in Rangoon to celebrate Burma's Independence Day

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► How to Make It Rain
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The Irrawaddy is navigable nearly to the northern border of Burma. Since the country has few railroads and highways, river traffic is thick. Thinking back to his tropical paradise, Kipling's soldier recalled the flotilla paddles "chunkin' from Rangoon to Mandalay." Though the British flotilla of gunboats is long gone and the era of the paddle wheel is just about finished, a fleet of Burma river boats, burdened with passengers and freight, beats up the Irrawaddy to Mandalay, in the nation's heart, and beyond. Churning upstream or gliding with the current, boats sometimes moor to riverbank trees when night falls. The Irrawaddy ties together the commercial outlets of Burma just as the Mississippi River system does in North America.

Most Burmese spend quiet lives, farming the rich river valleys and coastal plains. Rice thrives. Around seven million tons are produced annually, three million turned into export. Peanuts, cotton, beans, and sesame are among crops grown in cooler areas. Rangoon's open-boat market (below) resounds with voices of housewives haggling over bananas and vegetables.

Tropical forests covering many areas are axed for valuable teakwood, ironwood, palm, and bamboo. Forest depths awaken to voices of leopards and tigers; deer streak through brush; rhinoceros and crocodile roam their habitations. Big Burma elephants lend their strength to forestry. They drag teakwood logs and stack them skillfully.

Tradition clings to the Land of Laughter, defying Western inroads. Men and women stick to their national dress, the *longyi* (sarong) topped by a loose jacket and multicolored headcloth. Women side-step Western attire, favoring the sarong and jacket with

W. ROBERT MOORE, NGS STAFF

Burma

'Somewheres East of Suez' an Age-Old Country Marks Its 10th Year of Freedom

"FOR the temple-bells are callin' an' it's there that I would be . . . "

So wrote Rudyard Kipling about "the road to Mandalay." And though the poet never saw Burma, his lines have lent a magic to the country that still lingers in the minds of visitors.

The bells of such Buddhist temples as Rangoon's Shwe Dagon Pagoda (right) now mingle with the sounds of mills processing rice, oil, and lumber. Shiploads of tea and rice thread down the many-mouthed Irrawaddy River, bound for world ports. There is a great deal more to Burma today than the memories Kipling's British soldier had of temple bells, the wind in the palm trees, and "a Burma girl a-settin'."

WIDE WORLD PHOTO, INC.

There are, for example, people —some 19,000,000 of them. They spring from differing Southeast Asian strains—Burmans, Karens, Chins, Shans, and Kachins, scrambled with sizable groups of Indians and Chinese. Most are devout Buddhists. Burma offers them a land 1,200 miles from north to south and 500 miles across, a hot, wet climate, a nation that has just marked its 10th birthday.

In January, 1948, the Union of Burma emerged into the world—a totally independent republic with a President, Cabinet, and Parliament. The Union cut all ties with Great Britain. It is not even a member nation of the British Commonwealth of Nations. Thus ended the last vestige of British authority that began in the 1800's. Kipling's poem is badly out of date. When he wrote it, Burma was governed as a province of Britain's India.

The land drops down from the high-shouldered Himalayas on the northwestern and northern frontiers. Mountains close the eastern borders with China, Laos, and Thailand. From the mountains emerge three important river valleys—the Irrawaddy, the Sittang, and the Salween. Geographic note: Except in Kipling's poem, it is impossible for the dawn to come up "like thunder outer China 'crost the Bay."

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NEW YORK DAILY NEWS

Rain Making . . . Science or Luck?

SOME Burmese induce rainfall by staging a tug of war. The idea is that sky spirits only produce rain when they are excited—and a tug of war is about the most thrilling event these Burma tribesmen can imagine.

Far away from Burma, the reservoirs that supply New York City ran dangerously low a few years ago. So a police plane, above, flew off to spray clouds with chemicals. This is another kind of rain making. Many scientists regard its results as generally little more conclusive than those of the Burmese tug of war.

Clouds are made up of tiny water droplets, often supercooled. Unless they come together to form drops or snowflakes they are too light to fall. Three scientists, Drs. Irving Langmuir, Vincent J. Schaefer, and Bernard Vonnegut, discovered that pellets of dry ice, dropped through a rainless cloud, cool the droplets to the point of forming crystals—in other words, snowflakes. Similarly, vaporized silver iodide, or sometimes salt, often provides the nucleus around which drops or flakes form. In certain clouds, especially in warm climates, just plain water may trigger a sort of chain reaction, its drops causing other drops to form.

The government is watching progress. Professional rain makers earn money by seeding clouds in drought areas. Lawyers puzzle over law suits that may follow if artificial rain washes out public picnics or floods basements. Disagreements rage over whether rain making can be called successful. After all, who is to say whether a cloud-seeding plane caused rain or merely hurried it along?

Scientific rain making has been tried in Syria, Tanganyika, India, Pakistan, Peru, and even Great Britain—which suffers occasional droughts despite its notoriously damp climate. Since overseeding of clouds often disperses them and forestalls rain, that method has been used in Norway on murky days. But the most notable results come from Australia, where experiments have been quietly going on in the hope of bringing moisture to arid regions where the normal rainfall is desperately small. What there is is carefully measured by rain gauges. And Australian scientists now announce that two years of rain making boosted the fall by 25 percent.—E.P.

UMI

eye-catching buttons, some fashioned from jade, or glass. They adorn and perfume heavy long hair with flowers. But they may sport a wrist watch in concession to the century.

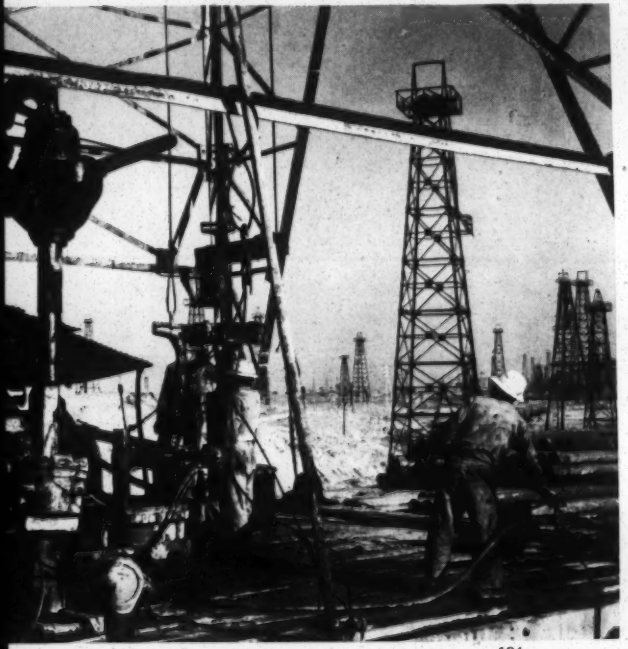
Many women are shrewd traders, and puff cigars during transactions. (Kipling described his Burma girl "a-smokin' of a whackin' white cheroot.") They enjoy more freedom than most Oriental females—even keep their maiden names after marriage. They dance beguilingly. Rhythmic movements of knees, hips, and hands unfold profound stories in Burmese ballet.

But progress has marched slowly toward some Burmese. Primitive Wa tribesmen prowl the hills around the often flood-rampaged Salween. Some practice head-hunting as a grisly fertility rite at planting time. The Burmese government frowns on the activity. Tribesmen plant sharpened and fire-hardened bamboo sticks in jungles for enemies to skewer themselves upon. Some have settled in more civilized areas, becoming classed as "tame Was."

Northward from the Was roam the Kachins, a fierce breed who tormented the Japanese invaders during World War II. They themselves were invaders from Tibet some 60 generations ago. "If I lie," they say, with drawn swords over their heads, "may the tiger eat me, may the Water Spirit swallow me up, may the lightning strike me, and may I die a violent death."

Though wearing wrinkles of age, Burma is a land in the making—undeveloped to its fullest worth. Its wealth of jade, tungsten, lead, silver, zinc, cobalt, tin, copper, lapis lazuli, and antimony is not completely explored. Oil fields (below) gush along the Irrawaddy between Prome and Mandalay. Some near midland Mandalay have produced oil since 1889.

For the lag in developing entirely as a modern nation, Burmese may accuse the mountain walls long sealing them off from their neighbors. But the world has shrunk. And Burma finds itself in that hot corner—Southeast Asia—where national destinies are yet to be decided. That's today's "road to Mandalay."—



National Geographic References: *Map*—The Far East (paper, 75¢; fabric, $1.50). *Magazine*—August 1944, "Aerial Invasion of Burma" ($1.50); October 1943, "Burma, Where India and China Meet" ($1.50); November 1940, "Burma Road: Back Door to China" ($1.50); October 1931, "Five Thousand Temples of Pagān" ($1.50). SCHOOL BULLETINS—January 17, 1955, "Five-Star Burma Cherishes Still-New Freedom" (10¢); February 8, 1954, "Burma Celebrates 'Union Day'" (out of print).

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OIL WELLS at Chauk, on the Irrawaddy, were first drilled by the British. Now British and Burmese work together in this oil field to produce about 2,700 barrels a day.

W. ROBERT MOORE, NGS STAFF

NATIONAL GEOGRAPHIC PHOTOGRAPHER B. ANTHONY STEWART

lore—a mixture of African, Indian, Spanish, buccaneer.

Nassau's open-air market, above, sells the straw products of a widespread Bahamian cottage industry. Since costs of government are almost entirely met by customs duties, Bahamians pay no income tax. So people and wealth have swarmed into the islands.

Fishing is the big business. Crews work their heavy sloops in all weather. Sometimes boats round up a school of tuna (right) like cowboys herding cattle. Yachtsman Carleton Mitchell, in this month's *National Geographic's* feature article, describes how, for relaxation, these sailors show their skills in the Out Island Regatta.

Confederate blockade runners put in at the Bahamas during the Civil War. Loyalists settled on Abaco during the Revolution. And at little San Salvador, upper right, Columbus first set foot in the New World.—E. P.

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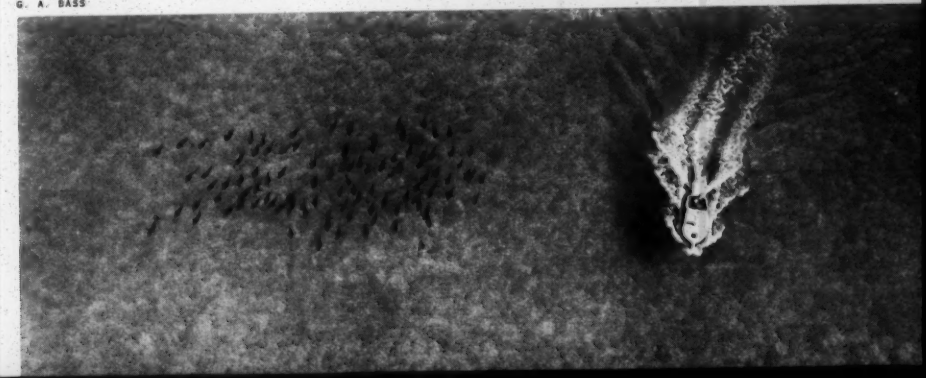
G. A. BASS



Shimmering Pearls on the Atlantic

BRITAIN'S BAHAMA ISLANDS

NATIONAL GEOGRAPHIC PHOTOGRAPHER B. ANTHONY STEWART

A MIGHTY rocket, soaring from the Air Force Missile Test Center at Cape Canaveral, Florida, is aimed to blast high above the northern rim of the Bahamas. Could you ride it and look down you'd see one tiny island after another receding below you. About 700 of them form the chain that sprawls haphazardly past Cuba and Haiti. Some 2,000 smaller islets, or cays, like Cat Cay below, some only juts of bush-covered limestone, scatter among them. From your rocket you'd note the shading of the Atlantic from pale blue to rich turquoise—a color map telling the depths throughout an underwater mountain range that forms the Bahamas. But you'd learn nothing of the life on these islands—and it would be your loss.

Nassau, the capital, on New Providence Island, submerges its origins as a pirate lair under a rich coating of fine hotels, the spit-and-polish of the British Governor's home. At night, however, the beat of Nassau's own "goombay calypso" (left) would remind you that this is the West Indies with its own folk-

CARL J. SCHMID

Game and human enemies fall at the strike of arrows. Enemies' heads are sometimes sought as victory tokens. Many people are still satisfied with stone tools and weapons. But western ways brushed some secret valleys during World War II. When a United States plane crashed in a hidden glen 150 miles south of Hollandia tall, handsome natives befriended the survivors—the first whites they had ever seen.

Copra and coffee are chief products of the poor soil. Despite swamplands and jungle, west New Guinea's acres are impoverished by limestone and coral. Organic topsoil required for sound farming is blistered by the sun and blasted by rains. Some high mountains are covered with snow and glaciers.

Persistent Netherlanders trained a few natives to operate tractors. Some of the men had never before seen a wheel. Strange native notions still harass the administrators. Swine, for example, are not only assets but are revered. Sometimes violence erupts. Twelve persons were reported slain and a village destroyed in one attack. Lowland tribes threaten small parties.

Some 50 religious missions reach many native lives. But missionaries must do more than preach and teach. They take on the tasks of explorers, physicians, agronomists, and diplomats. Weeks pass without glimpse of white men.

New Guinea was once connected with Australia's land mass and has a related flora and fauna. Wallabies and tree kangaroos hop through tall grass. Such small mammals as the echidna, rats, and giant fruit bats lurk in rain forests. Reptiles squirm innumerably. Birds of paradise lend soft colors to savage backdrops. Here live pigeons, parrots, and the flightless cassowary. Ants, wasps, mosquitoes, and leeches, torment travelers.

What, in such a land, arouses a peace-disturbing dispute? The glimmer of wealth. Copper is mined in eastern areas; gold has been profitably mined and carried out by plane. Undeveloped coal seams lie underground.

Netherlands and Australian governments plan to exchange specialists in developing natural assets. Already, Netherlanders drill for oil in jungles near Sorong, at the island's northwestern end. But the clang of machinery is now dimmed by the noisy question of ownership.—S.H.

HILLY HOLLANDIA, with Lake Sentani in background, seethed with wartime activity

U.S. ARMY AIR TRANSPORT COMMAND

Disputed West New Guinea

ONE subject burns deep in Djakarta and Hollandia, respective capitals of Indonesia and Netherlands New Guinea. Will the Netherlanders deliver potentially-rich west New Guinea—its last foothold in Asia—to young Indonesia? The area was side-stepped when the Dutch transferred sovereignty over the Netherlands East Indies in 1949 and 3,000 islands became Indonesia.

The Netherlands then agreed to discuss ownership of west New Guinea at a later time. Now, Indonesians insist that the time is overdue. Among the tensions plaguing Southeast Asia, the west New Guinea dispute plucks at deep emotions, beyond politics and economics. Asia for Asians is a fond Oriental hope. The presence of outside governments often rankles.

ADDISON NOY

STILTED HOMES of thatch shelter as many families as can fit inside at this native village near Hollandia.

The huge island in dispute is dual controlled. Neighboring Australia administers North-East New Guinea and Papua under the International Trusteeship System. The Dutch hold on the western side dates from early days of the Dutch East India Company.

The entire island resembles a prehistoric reptile, its tail drooping eastward, its turtlelike head poking toward the islands of Celebes and Borneo.

Except for Greenland, it is earth's largest island, extending 1,500 miles from head to tail. Forbidding mountain chains lift little-known peaks 15,000 and 16,000 feet. The disputed area—the reptile's head, shoulders, and front belly—covers nearly 160,000 square miles, larger than California.

A 16th-century Spaniard found a similarity between the island people and those of Guinea in West Africa. Hence the name—New Guinea. Indonesians call the western half Irian. Islanders are mainly Papuans, Melanesians, and Negritos. They number only 700,000 in west New Guinea compared with 1,700,000 in the eastern half overseen by Australia.

The natives are an element in Netherlands contentions. New Guinea, it is said, has no racial or cultural ties to Indonesia; therefore the island's destiny should be of its own making. But New Guinea's tribesmen are remote from politics and progress. Their home ranks as one of earth's most primitive areas, though lying a slight 90 miles across the Torres Strait from Australia.

Thatched villages snuggle between mountains that have seldom been explored or measured, and may not even be mapped. Many natives are scarcely beyond Stone Age attainment. Some are six-footers; some are small, round-headed folk called the Tapiro Pygmies, doomed to furtive lives in the shadowy interior.

pump oil which is mixed with air to burn behind rotating lenses. Beachy Head's keepers work for eight weeks at a stretch, then have a welcome month ashore.

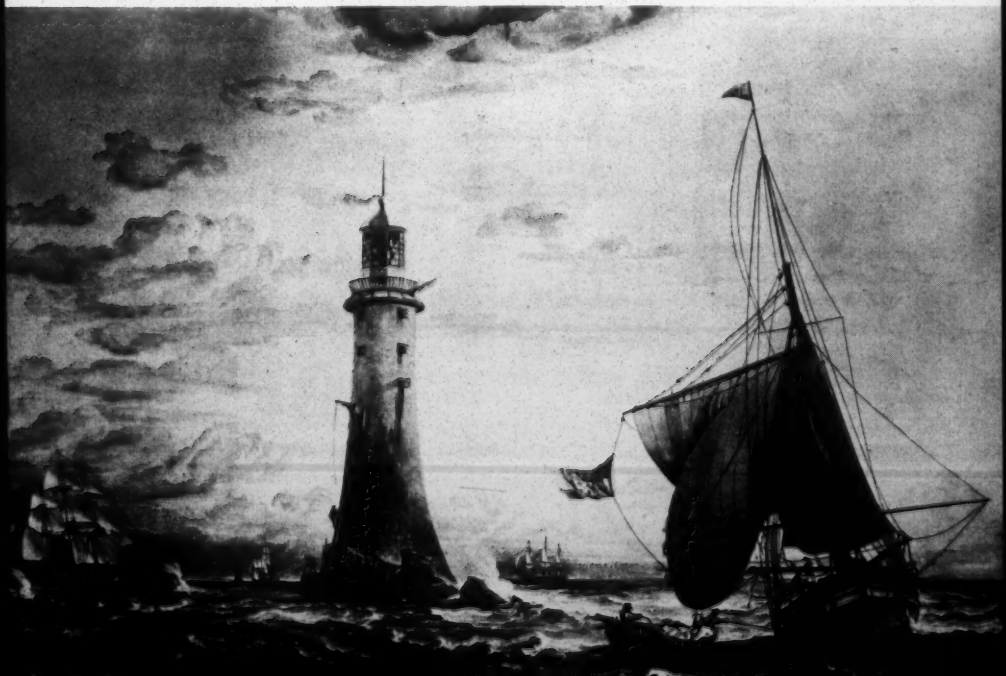
Fortitude and heroism were etched on the early keepers' faces. Man and wife teams often manned the lights under an iron tradition: The light *must not* fail. Deep-water sailors sometimes "swallowed the anchor" to take lighthouse jobs ashore. Work was lonely and demanding. Lamps were trimmed and cleaned repeatedly throughout nights. Sometimes keepers launched small boats and bucked hazardous waves on rescues.

Women appeared as keepers during the 1830's, mostly in New England. They were generally the widows of keepers. They numbered about 31 by 1851. Thereafter, their ranks thinned with the introduction of steam-driven foghorns, heavy lenses, and other too-burdensome devices. One of the last in service was Mrs. Harry Salter, keeper of a tiny light at Turkey Point on Chesapeake Bay. She finally quit in 1948, after 23 years, because the job was "too hard on the feet." An official tribute commemorates the women's service. They "often performed acts of heroism, not unexpected where they lived so surrounded by the sea."

Young, schooled men of the United States Coast Guard now man the lights around the United States. But scientific instruments have eased the need of great ships for the winking gleam. First came radio, heralding electronic navigation. Electronic depth finders enable vessels to pass shallow waters without going aground. Radar, World War II development, alleviates dangers in night and fog. Loran transmitting stations flash signals utilized by navigators to determine the geographical position of ships.

But for countless craft, lighthouses still stand as landmarks by day and guides by night. And for millions of mere landlubbers, there will always be a sense of the sea and romance in the very wink of a lighthouse eye.—S.H.

EDDYSTONE LIGHT still warns shipping of a dangerous reef in the English Channel



U.S. COAST GUARD

Sentinels of the Sea

Eyes search the darkness, squinting against the unrelenting breeze, the chilling flecks of salt spray. The softly glowing binnacle shows a nodding, unsteady compass. How far off course has the vessel strayed?

And then the answer comes in a far distant wink of light, low on the horizon. Navigation is vindicated. The ocean has relinquished one of its secrets. The sailor knows where he is.

This vignette is re-enacted over and over, wherever ships sail. Its happy outcome is routine—because centuries ago men saw the need for lighted beacons to guide their vessels away from danger. Amelia Island Light, on the Florida coast, above, can be seen 16 miles. It is one of more than 350 lighthouses along the shores of the United States—including the Great Lakes. It is one of thousands around the world, quietly doing their taken-for-granted job.

History's most famous lighthouse stood on Egypt's island of Pharos. It became one of the Seven Wonders of the Ancient World. Perhaps the oldest lighthouse still standing is the Roman structure (page 192) at Dover, England.

America's first lighthouse was lit September 14, 1716, on one of the Brewster Islands outside Boston. Within 50 years after independence, some 66 lighthouses stood between Maine and Florida as safeguards to mariners and testimonials to a maritime destiny. Supreme engineering skills were sometimes pitted against challenging locations for lights. A lighthouse was built, finally, in mid-19th century on 20-foot-wide Minots Ledge, one of the Cohasset Rocks, in Massachusetts, where between 1832 and 1841 some 40 wrecks darkened the vicinity.

Lighthouse architecture has changed from the original tall masonry structures to towers of concrete and steel. Many are short on the Pacific coast where high bluffs lend elevation; they are taller on the low-lying Atlantic side. The tallest tower, 191 feet, is at dangerous Cape Hatteras, in North Carolina. The Coast Guard's brightest beam, some 5,500,000 candle power, is thrown by Hillsboro Inlet Light between Palm Beach and Miami. New York's Navesink Light had 9,000,000 candle power during World War II. It is now discontinued.

Beams progressed down the ages from burning wood to kerosene to electricity —power carried in by wire or generated on the spot.

Some lenses are large enough for several men to stand inside. Flashes come by revolving the lens around the lamp. Lighthouses situated near each other flash different kinds of lights, recognizable to mariners.

At Beachy Head, off the Sussex coast of England, a keeper (below) services the 274,000 candle-power lamp that warns off ships bucking an English Channel gale. He is one of four men, three of them on duty all the time, who

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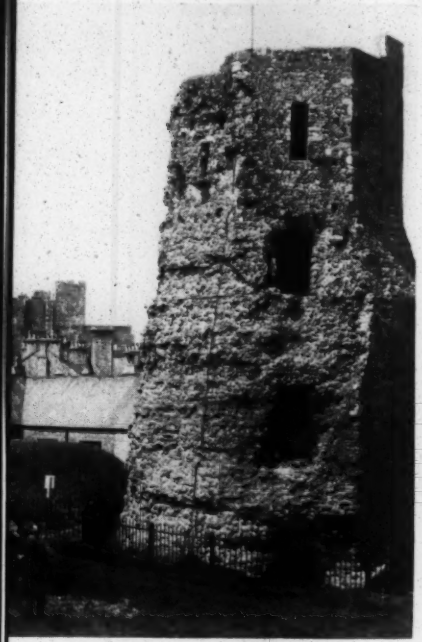
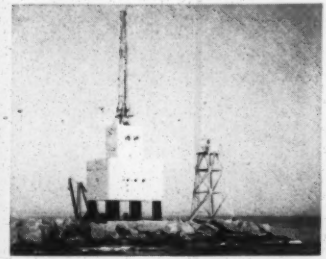
Lighthouses, Like Fashionable Ladies, Dress for Both Time and Place



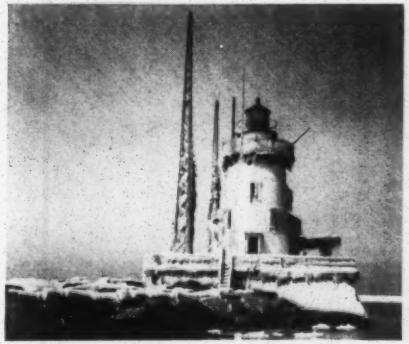
EWING GALLOWAY

ERAS SEPARATE this British ruin and the Long Beach, California, robot light. Robot's "eyes" are fog horns; the light pivots above. The antenna transmits radio warning.

An old Roman light stands yet above the rugged Channel coast. Cleveland Light (bottom middle) shivers on Lake Erie's shore. Modern-day Long Beach Light (below) needs no keeper.



U. S. Coast Guard Photographs



'. . . The Lighthouse lifts its massive masonry, a pillar of fire by night, of cloud by day.'

LONGFELLOW

MARSHY GROUND at Sabine Pass, Texas, ordained this buttressed base. Historic Boston Light (below) moves gracefully into the air age.